EFFICIENCY AND RADIOACTIVE AEROSOL PERMEABILITY OF AFA-RSP-20 ANALYTICAL FILTER

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AFA-RSP-20 radiometric analytical filter is one of the most used Petryanov filters in radiation protection and alpha measurements (radiometry and spectroscopy). Therefore, the properties of this filter like efficiency and the permeability of the radioactive aerosol particles through it is more important for accurate dose estimation. In this work, an experimental setup has been constructed to study the efficiency and permeability of the radioactive aerosol particles through AFA-RSP-20 radiometric analytical filter. A standard radon chamber, 2 m^3, at Ural federal university is used. The dependence of RSP filter efficiency on the aerosol concentration and air sampling velocity is tested and the relation is described. The RSP filter efficiency increasing with the aerosol number concentration at different air velocity. The value of the efficiency between 92-97%. Due to the aerosol activity level increases in the radon chamber, the sensitivity of the measurements is sufficient for a correct estimation of the permeability of radioactive aerosols passed through the RSP filter. The effect of size modes of the radioactive aerosols passing throw the filter is studied with special diffusion battery. At low aerosol concentration, the filter prevented all unattached radon decay products (1-5 nm) and the most size activity became with AMTD ~ 20 nm. At high aerosol concentration in the radon chamber, the activity of unattached fraction nearly deleted. The activity of aerosols with AMTD ~ 20-40 nm is increased.

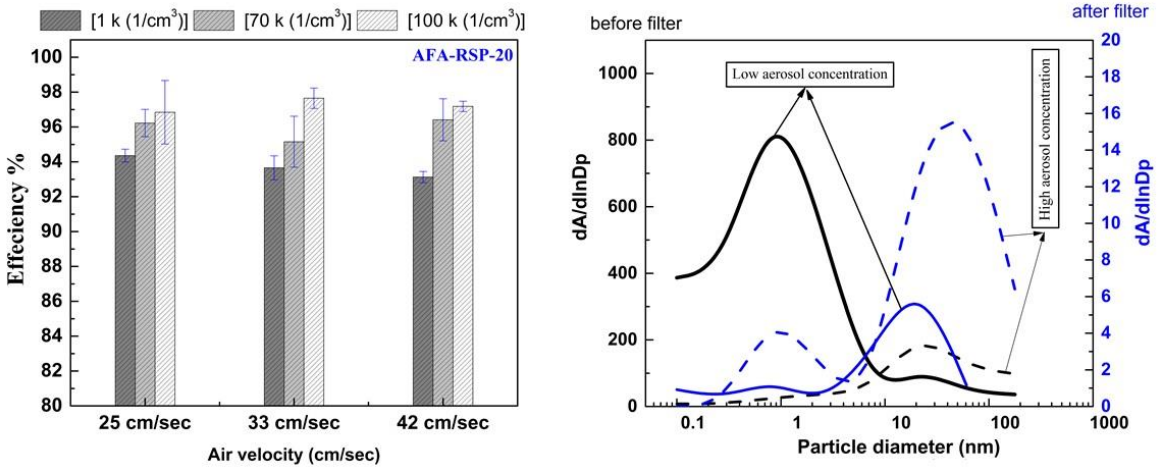

Fig. 1. AFA-RSP-20 filter efficiency in left side and permeability of the ultra-fine radioactive aerosol particles through the filter in right side.